SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / May 1973

Land Use Planning ?

SOIL
conservation

May 1973, Vol. 38, No. 10

"Land use planning" is a multi-meaning phrase that trips easily off the tongue. But it is subject to numerous interpretations. What does it mean in 1973—and to whom does it have that particular meaning?

To find out, we asked a number of different people, and the representatives of some organizations active in land and water use and planning work. Each, naturally, sees it from his or her own professional or geographical viewpoint—but all of them tend to agree that *some* form of planning of our natural resources is necessary, and that the intensity of planning effort will increase.

In the following pages, you will read the views of various people involved in this interesting and vitally important field.

COVER: Shows an all too common scene. The soils on these "dream" acres can cause future homeowners serious problems.

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SOIL CONSERVATION is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1968.

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Subscription: $3.50 per year, $4.50 foreign. Single copy 45 cents. Discount of 25 percent on orders of 100 or more sent to same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Land Use: Past and Present

by Kenneth E. Grant
Administrator, SCS

America for many years has pursued conscious land use policies at the national, state, and local level, and these policies have had an important impact on the course of the nation's development.

When the first European settler in this country swung an ax against a tree to clear an acre for farming, he was making a land use decision. He did not weigh the long-term consequences of his action, nor did he carefully examine the land use alternatives and their relative impact on the environment.

He chopped away with a single-mindedness that we well might envy in these complicated times, because he was driven by a clear necessity to build a log house and to get in a crop to feed himself and his family.

The desire of individuals and their families to conquer the wilderness and make a living from it dictated many of the early land use decisions. One of these was that the public domain should become a source of national revenue through land sales. During the nation's first 45 years, more than 87 million acres of land were sold, yielding the treasury a substantial amount of money.

There were, however, sharp differences over how to conduct the sales. Big land settlement companies and speculators wanted the land sold in large blocks—to them. Individual settlers wanted the land to be sold in small acreages—to them. In fact, land was sold to both types of customers.

Differences in land use policy also grew between the East and the West. Eastern industrialists did not want their cheap labor supply to drift West while western settlers wanted cheap or free land and liberal farm credit terms.

But despite the disagreements, there was a strong and growing sense of national destiny during the 19th century that aimed toward taming and settling a whole continent, from the Atlantic to the Pacific. If one could summarize in a single sentence the land use policy of the United States between the landing at Plymouth and the year 1900, it might be: fill it up, connect it up, use it up.

In 1862, the Homestead Act was passed, under which the federal government presented 160 acres of public land, at a nominal fee, to any settler who would live on the land and work it. During the Civil War alone, 150,000 homesteads, involving 25 million acres, passed into private hands. Eventually 1⅓ million homesteads were taken up and carried to completion under this act.

National land use policy also was expressed in our dealings with the American Indian tribes, who were pushed aside in the expansionist rush to settle and farm the whole nation.

One of the first important brakes on America's land policy of expansion and exploitation came in 1891, when Congress empowered the President to set aside forest reserves to protect the nation's timber supplies. Presidents Harrison, Cleveland, and Theodore Roosevelt subsequently proclaimed most of the present national forests.

Preservationist land use policy also was expressed by creation of several national parks to preserve unique scenic wonders and several game preserves and wild bird refuges.

By the 1920's farm problems had begun to intensify. A good perspective is provided by the proceedings of a National Conference on Land Utilization, held in Chicago in November 1931.

Some of the problems discussed at the 1931 conference loom even larger today. Then, as now, there was a lack of rural job opportunities, and one speaker noted that "in some parts of the country, most of the boys and many of the girls leave the farm or town before they are 20."

Several speakers at the 1931 conference called for a federal program for soil conservation. George D. Pratt, then president of the American Forestry Association, said: "Conservation of the soil, I think, can be set down as the first fundamental of both conservation and land utilization."

In 1933, the Soil Erosion Service was established, with Hugh Hammond Bennett as its director. In 1935, the agency became the Soil Conservation Service.

Problems resulting from soil erosion had reached crisis proportions when SCS was created. Overplowing of the Great Plains grasslands led to the dramatic duststorms of the "dirty thirties." Thousands of farms in all parts of the nation were abandoned because their owners believed the soil was "wornout," and some of the finest cropland of the Southeast was eroded and gullied to a point where it seemed impossible to repair.

After a period of demonstrating soil and water conservation techniques to farmers, a successful program of providing technical aid to farmers and other land users through locally organized soil conservation districts emerged. This unique approach has resulted in land improvement, and changes in rural land use, to a degree almost beyond belief for a voluntary, cooperative program.

By June 30, 1972, more than 2.2 million land users were signed up as cooperators with more than 3,000 local conservation districts. More than 1.7 million conservation plans had been prepared, most of them for farms and ranches, and they cover nearly 600 million acres.

Statistics cannot show the results of this planning as well as an air or auto tour of the countryside, because the soil conservation program has literally changed the face of rural America. A few brief statistics, however, do offer some notion of the scope of change:

Today:

	million
Grassed waterways or outlets, acres	1.8
Contour farming, acres	48.7
Terraces of all kinds, miles	1.2
Stripcropping, acres	21
Range seeding, acres	15

The program also has resulted in remarkable shifts in land use—again, on a voluntary, cooperative basis—from cropland to:

	million acres
Grassland	24
Woodland	2.8
Wildlife and recreation	1.4

In 1956, Congress established the Great Plains Conservation Program, under which landowners make long-term contracts with the U.S. Department of Agriculture to restore their land and establish necessary conservation measures. By June 30, 1972, USDA had contracted with over 42,000 Great Plains landowners to assist in the conservation treatment of over 77 million acres. In the course of the program, over 2 million acres of land were converted from cropland to permanent grassland. Data gathered in 1967 show that about 6 million acres in the Great Plains need to be converted. A good start has been made.

Programs for crop acreage adjustment and conservation administered by another USDA Agency—the Agricultural Stabilization and Conservation Service and its predecessor agencies—also have had a profound effect on land use in the United States.

This is a very much abridged history of land use—particularly rural land use policy—in the United States.

What is the current picture?

SCS has a pretty good idea, since our agency has leadership in conducting the Conservation Needs Inventory, a national inventory of private land use. The 1967 data tell us that:

Of the 2¼ billion acres of land in the 50 states, about a third is public land owned by the federal government.

Of the remaining two-thirds, about 3 percent is urban and 2 or 3 percent is owned by state, county, or local governments. An additional 2 percent is reserved for American Indians.

The remaining 59 percent of America's land—some 1.3 billion acres—is privately owned rural land that is almost equally divided among the three major uses of cropland, pasture and range, and forest land.

The Conservation Needs Inventory also revealed that while we are fortunate to have abundant soil resources in this country for future needs, more than three-fifths of America's private land is not being cared for to the degree that conservationists feel is necessary to protect the soil for sustained use.

Despite the sizable job remaining, several recent changes provide new hope for sharp gains in soil conservation on cropland. A significant one is the practice of minimum tillage, which has grown from less than 5 million acres in 1964 to about 22 million acres today.

No-till, a form of minimum tillage in which the surface of the soil is not disturbed at all except to drill in the seed and fertilizer, results in the least soil erosion of any conservation practice yet adopted by American farmers.

Today, many people question whether voluntary action alone can solve America's persistent natural resource problems. Iowa has turned to a mandatory program for preventing excessive soil losses on farms. Other states are watching the results carefully as they consider the need for legislative controls over land use and treatment.

Some important natural resource problems will not be solved by technical solutions alone, because they result from conflicts over land use. For example: urban people are turning to rural America in increasing numbers for recreation—including hunting, fishing, water sports, and snowmobiling. To some farmers and other rural residents, this means a welcome new source of income. To others, it represents a disagreeable intrusion and unwelcome competition for rural land.

Many water-resource projects, such as those in the Public Law 566 program, like almost any major works of improvement today, run into local conflicts in land use—conflicts among those whose main interest is agricultural production, or urban growth, or fish and wildlife, or scenic values. The conflicts arise not only during planning, but also after project installation.

A better dovetailing of interests is needed among those concerned with land use planning and those concerned with flood protection. In the absence of any clear guidance in the form of federal, state, or local land use policy, the conflicts can degenerate into lengthy, expensive, and often fruitless debate, or they can be settled in favor of the most powerful pressure group or economic interest. The result may not necessarily coincide with the long-term best interests of the community or the nation.

". . . he was driven by a clear necessity to build a log house and . . . feed himself and his family."

The Soil Conservation Service will do whatever it can to help landowners and governmental bodies make land use decisions and policies on the basis of natural resources facts.

Today there is sufficient land in America to meet both present needs and those projected fairly far into the future. With greater attention to adequate conservation treatment, we can stretch our available land resources even further. I feel that we can afford—from the standpoint of national policy—to preserve substantial acreages that have special environmental values, if indeed we can reach agreement on which values are most desirable and most in the public interest.

At the same time, Americans should keep in mind that just as there are places such as Yellowstone and Yosemite with unique and special scenic wonders, there also are special agricultural areas with rare combinations of soil and climate. An example is our diminishing acreage suitable for citrus production. Perhaps high-quality citrus land should be preserved for agriculture, just as national parks have been preserved for all the people to enjoy.

SCS technical people, and other USDA employees, are giving an increasing amount of resource assistance to local units of government and various planning bodies. SCS has been drawn into this work for an obvious reason; the soil data we possess and the conservation techniques we practice are as useful to urban and suburban developers and builders as they are to farmers and ranchers.

The "discovery" of soil and water resources as a significant input in conventional urban land use planning has taken place only in recent years. A number of

Continued on p. 219

Look at the LAND First

by Norman A. Berg
Associate Administrator, SCS

The United States is among the richest nations on earth in terms of its land resource. And the future of this resource is in the hands of millions of people who daily make decisions—good or bad—on how it is used.

Over half of the American land is in private hands—owned by individual farmers, ranchers, businessmen, and industry. It is this land that produces most of the food, fiber, and timber we consume and export.

One-third of privately owned land is in forests. One-third is in pasture and range. And a little less than a third is in cropland.

Despite an almost 200-percent increase in population since 1900, these proportions in land use have changed very little. The primary reason is technology. Our crop production per acre continues to exceed our increase in population.

The second largest amount of land is federally managed. This includes 34 percent of our total land area, or 759 million acres, most of it located west of the Mississippi. Of this, 187 million acres are managed by the Forest Service, including 14.5 million acres that have been set aside as wilderness and primitive areas. Timber will not be harvested there.

Much federally owned land is under multiple-use management, and recreation is one of the major uses. With more spendable income, increased leisure time, and greater mobility, the demand for outdoor "sun and fun" use has grown rapidly. Recreation is a possible land use on 447 million acres under federal management, 40 million acres under state control, and 3 million acres in county hands.

Much private land is also used for recreation, especially hunting and fishing. The majority of upland small game finds its home on privately owned farm and ranch lands.

Finally, about 5 percent of the American land is in state or local ownership, while 2 percent is Indian land.

Much of America's land has been well used by its farmers, ranchers, and other landowners. But this has not always been true. Poor land use practices have cost us dearly, both economically and esthetically.

Some farmers still attempt to cultivate soils that are too steep and erosive, or grow row crops on the high risk land in parts of the Great Plains.

Some landowners needlessly burn forests. Some owners or users contribute to flooding problems for themselves and their neighbors through unwise land use practices. Fifty percent of the nation's annual flood damage comes from small upstream watersheds where both public and private property are destroyed.

Unsightly scars have been created on 2 million acres of land through strip mining and the mine acid that leaches out of the spoil banks and pollutes streams for miles around.

Solid waste is another byproduct of our affluent society. We discard 250 million tons of waste each year. Two-thirds of it goes into 40,000 open dumps, mostly in rural areas where it pollutes air, water, and land.

Animal waste has a serious negative impact on the environment. Large concentrations of beef cattle—feedlots with as high as 50,000 head at a time—produce hundreds of tons of manure a day. This not only pollutes the air, but the runoff can accelerate eutrophication and destroy streams, ponds, and lakes.

By volume, sediment is our most costly water pollutant. About half of it comes from cropland erosion while the other half comes from highways, stream-

banks, public lands, and suburban developments. Sediment yields on a single acre of land can skyrocket from 50 to 25,000 tons a year when land is converted from rural to urban uses—and more than 1 million acres a year are being converted to homes and businesses and roads and airports and reservoirs.

In the next 10,000 days, we will build in and around our metropolitan areas the equivalent of everything we've built since Plymouth Rock. A staggering amount of needless damage will result. Not just from sediment, but also from ignorance of the land's capabilities. Roads, homes, and other buildings will be constructed without checking as to whether the soil is suitable for the type of construction used. As a direct result, many houses will crack or slip downhill, or avalanches will slip down on *them* if housesites are chosen without considering that factor.

The costly and ugly misuse of land is distressing to more and more Americans, because soil and water are national resources. To despoil them is to show contempt for our heritage and an inexcusable disregard for our future.

In many cases, the man in the middle of all this is the farmer or rancher. Unplanned, checkerboard development puts a tight economic squeeze on him that can't be ignored. His land becomes a valuable commodity as suburbia comes closer. His taxes increase and quite often he is forced to sell before developers are ready to build. Then the speculator takes over from the cultivator.

But proper land use planning can help protect and develop natural resources in rural *and* suburban areas.

Soil and water conservation practices can greatly reduce erosion and flooding on agricultural land. Strip mine spoils can be reclaimed and revegetated. Suburban sediment can be drastically reduced by adapting the proved practices that farmers and ranchers have used in protecting their farmland over the past 30 years.

And land capability can be determined long before urban construction work is started.

Americans today are insisting on a high-quality environment where they live, work, and travel for outdoor recreation.

They want attractive homes and new urban communities in an attractive environment.

They want a high-quality food supply at reasonable prices, which means that land use planning must adequately consider the needs of an efficient and productive agriculture.

And they want space and facilities for outdoor recreation, and for fish and wildlife.

All of these needs should be considered in setting land use policies and making land use plans. The individual and his community have everything to gain if land use is properly planned. They have a great deal to lose if it isn't. ♦

Land Use Planning Viewpoints

Land use policy is a basic responsibility of state and local governments. They are closer to the problems and closer to the people. Some localities are already reforming land use regulations—a trend I hope will accelerate. But because land is a national heritage, the federal government must exercise leadership in land use decision processes, and I am . . . proposing that we provide it.

PRESIDENT RICHARD M. NIXON
Address to Congress
February 15, 1973

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanized man, nor for us to reap from it the esthetic harvest it is capable, under science, of contributing to culture.

ALDO LEOPOLD
A Sand County Almanac

With more (land use) controls, we'll fall into mediocrity and people will go to other states like Virginia and New Jersey.

Maryland Beach Area Land Developer, 1973

Conservationists describe the changing attitude toward land by saying that land should be considered a *resource* rather than a *commodity*. But while this correctly indicates the direction of the change, it ignores the crucial importance of our constitutional right to own land and to buy and sell it freely. It is essential that land be treated as both a resource and a commodity. The right to move throughout the country and buy and sell land in the process is an essential element in the mobility and flexibility our society needs to adjust to the rapid changes of our times.

The Quiet Revolution in Land Use Control
Council on Environmental Quality

Instead of laying down an arbitrary design for a region, it might be in order to find the plan that nature has already laid down. One way would be to chart all of the physical resources of the region—especially its drainage network—and see what kind of picture emerges.

WILLIAM H. WHYTE, *from*
The Last Landscape

If planning is to mean anything, then it must be effective; and this means it must prevent some people from doing what they would otherwise choose, or must push others into doing what they would prefer not to do, or both. This country urgently needs forms of land use control, stronger than zoning, that are truly effective, can exert their effects promptly and are democratic in imposition and operation. In my view, one of the best candidates is a new form of public land ownership with some unit of government acquiring land from present owners and serving as the mechanism for transferring the use and control over the land to new owners and users.

MARION CLAWSON, *Resources for the Future, Inc., at the Nat'l. Conference on Land Use Policy, Des Moines, Iowa, Nov. 1972*

Most planners in the U.S. have been trained as urban planners. Most of the comprehensive planning that has been done has been done in urban areas. It is important as we extend the planning process to rural areas and to matters dealing with land and other natural resources to be certain that there is input from those who have the most background in this area.

Statement by the National Association of Conservation Districts to the Senate Committee on Interior and Insular Affairs

In the decade of the seventies, the regulation and control of land use will be extended beyond anything we have experienced in this field to date. . . . To a large extent, the controversy will center on two very practical questions: (1) can private land uses be controlled for public benefits and purposes; and (2) does the owner of open or rural land have a right to a monetary profit, not simply from the productivity of his land and his managerial inputs, but from the unearned increments due to fortuitous location and population growth or movement—urbanization. For land use regulations and controls to be carried out effectively, the first question will have to be answered YES, and the second question NO.

NORMAN WENGERT
Professor of Political Science
Colorado State University at the National Land Use Policy Conference, Des Moines, Iowa
November 1972

From now on, when we build a road, or a shopping center, or develop a residential neighborhood, we must know precisely what impact that building will have on our environment. In this effort, technical assistance of the kind SCS can provide will be valuable.

GOVERNOR THOMAS J. MESKILL *of Connecticut, Speech of Nov. 16, 1972*

In developing our land-use pattern, we have paid too little attention to the suitability of land for different purposes. On occasion we build a riverside park or preserve a strip of beach for public use, but generally short-term economics have governed land use.

STERLING BRUBAKER, *from To Live on Earth*

We are confronted with insurmountable opportunities.

POGO

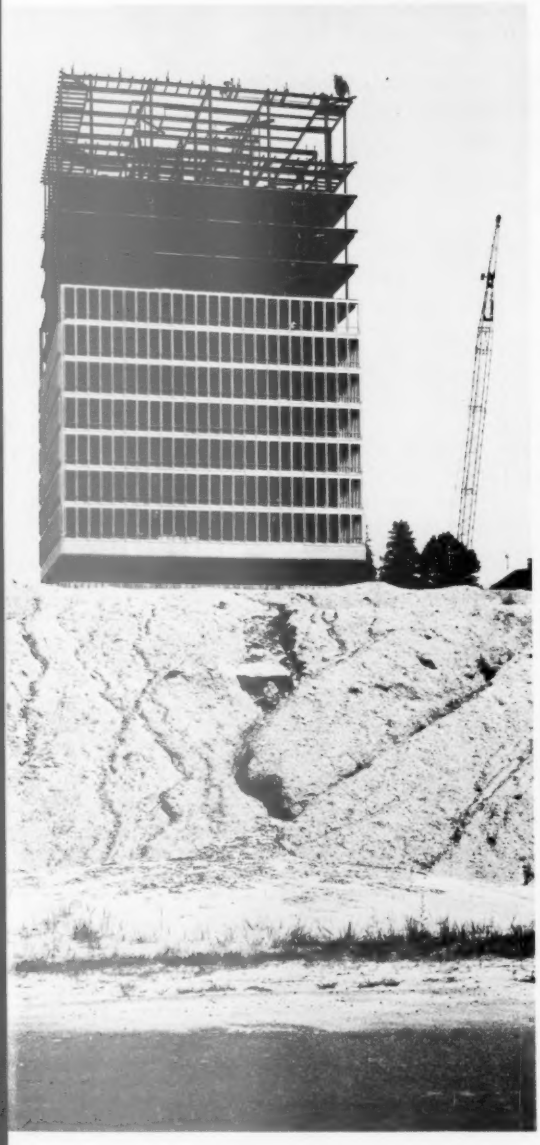
A builder's code for conserving natural resources

Prepared by the former Douglas, Nebraska, Soil and Water Conservation District—

1. Choose the land that has suitable natural drainage and soils for the intended development.
2. Waterways and flood-plain land should be considered for park and other open-space uses.
3. Save natural vegetation and trees wherever possible.
4. Plan for the safe disposal of increased runoff caused by rooftops, pavement, and straightened waterways.
5. Plan streets to fit the contour of the land, avoiding long stretches of steep grade.
6. Provide adequate drainage to and from streets, to storm sewers or other runoff disposal practices that do not erode the land or inundate property below.
7. Hold the amount of land area graded at any one time to a minimum and stockpile the topsoil for reuse in preparing the final seedbed.
8. During and after grading, plant a temporary vegetative cover which will protect the bare soil surface.
9. Construct sediment basins to remove sediment from runoff waters during development.
10. Install drainage structures and plant permanent vegetation compatible with future turf as soon as possible.
11. Obtain technical assistance from the local conservation district on any of the above items, if needed.

Jean Packard

Optimist in Suburbia



Seventy percent of all Americans live in urban or urbanizing areas. One rapidly growing area is Fairfax County, Virginia, adjacent to Washington, D.C. Already home to half a million people, its continued growth has spawned environmental and land use planning problems.

Mrs. Jean Packard is chairman of the Fairfax County Board of Supervisors. A longtime conservationist, she has been chairman of the Northern Virginia Soil and Water Conservation District, president of the Northern Virginia Conservation Council, a director of the Conservation Council of Virginia, and a member of the Fairfax County Human Relations Council. She was interviewed by a member of the Soil Conservation Service Information Division.

Mrs. Packard, what are some of the environmental and land-use problems associated with development in northern Virginia?

Our streams are being destroyed by development; we're losing our topsoil to development; we're paying a terrific price to refurbish our parklands, which are being destroyed by silt that flows down from uncontrolled development.

As an example, Fairfax County had asked the Northern Virginia Soil and Water Conservation District to comment on a specific zoning case that was coming up. It was about 50 acres of very difficult land. About 17 percent of it was flood plain, and it had a high water table and a beautiful stand of hardwood, one of the prettiest stands in the county.

The developers wanted a tremendous complex of about 10 buildings, 10 to 14 stories high, and two layers of underground parking on this land. As to the watershed drainage, they intended to take the small stream on the property, put it into a pipe, tunnel it under I-66, the southern boundary of the property, and then just turn it loose into a little stream that feeds down into Lake Accotink, which is a county park.

The little stream is in bad shape already because of the construction that's going on. It's been badly damaged. The developer was going to take this huge volume of water to the end of the subdivision property and just dump it—all the velocity from all this runoff—with no thought of what would happen when it reached Lake Accotink, which was purchased with taxpayer's money and must be maintained by taxpayer's money.

The taxpayer pays for bad development?

For all development. People in Fairfax County have been led to believe that when we grow, we keep our tax base down. Well, we've been growing—skyrocketing—and our tax rate has been increasing faster than our popula-

tion. The costs of everything—government services, public facilities, the public service areas—the total cost of government, *everything* increases at a faster rate than your population increases.

What's the answer? To stop growth?

You don't want to stop all growth. And if you did want to, you couldn't.

How can development be controlled?

Planning. Your planning should be on the basis of natural boundaries, such as watersheds, which would make far more sense than an arbitrary political line that's drawn on a map somewhere. The first place, the easiest place to effect this is locally.

In planning, what should be the relationship between population and resources? What are the guidelines?

There aren't any; this is our problem. If we want to take a long-range viewpoint, I think human population and land use should relate on the basis of the carrying capacity of our natural resources.

People move out to a beautiful area like Fairfax County because of the natural amenities—the streams, the trees, the grass—and then sit helplessly and watch the city engulf them. Now, at some point, someone's got to say "Stop! No more!" I want to say that "Stop!" before everything's destroyed.

Mrs. Packard, at one time you were chairman of the local soil and water conservation district, so you're well aware of what districts do. What do you see as their role in an urbanizing area?

I see the role of the conservation district in areas such as this as assisting citizens to protect their own environment. This is particularly needed because there is a natural, built-in inclination in most local governments towards growth and development.

How did you first get involved in soil conservation work?

In 1966 I was with the Land Use Planning Committee of the League of Women Voters, and the committee started to take a look at the siltation and erosion problems accompanying the county's tremendous growth.

With the help of the district and the SCS district conservationist, I put together a slide show on erosion and sediment problems in Fairfax. For a solid year the League of Women Voters devoted themselves to speaking on the subject any time three people gathered on a street corner. We talked to government officials, civic organizations, builders, the planning commission, anybody who would listen. We gave them the straight horror story of what was actually going on. We impressed this upon enough people, and we got an erosion control ordinance.

Obviously, you feel that women can be effective in working for a better environment.

Women can be invaluable. They are attuned to environmental problems; they see what happens out of their back window. They're involved because of their children. And, of course, much of the volunteer work in an area like this has to be done in the daytime, when the county government functions and the public hearings are held. Consequently, women who are not holding down full-time jobs are invaluable for this work.

Finally, you've made some pretty grim statements. Are you hopeful or pessimistic about environmental improvement and better land use in urbanizing areas?

I'm the greatest optimist you'll ever want to know, because I've seen the tremendous changes that have taken place here in the last 10 years, and I've seen what can happen when you tell the people what goes on and they act on it. ♦

Continued from p. 213

events have contributed to this new awareness:

—Suburban sprawl and the growing demand for open space for recreation and esthetic uses.

—The Federal Flood Insurance Program, which requires that communities institute flood plain zoning in order to participate.

—Diminishing ground water supplies, which have demonstrated the importance of keeping ground water recharge areas free from development.

—The destruction caused by mudslides and erosion as a result of building on steep hillsides.

—The nuisance and health hazards caused by increasing numbers of malfunctioning septic fields.

—The rapid development of the "second home" and "lakeshore development" business.

Many agencies, at all levels of government, are working hard to translate this new awareness of soil and water resources into intelligent land use decisions.

My personal involvement in the soil conservation movement has given me enormous respect for the recuperative powers of the American land. There have been many land use changes in this country, some productive, and some which seemed disastrous at the time. But so far, we have survived the mistakes, and, in most cases, we have learned to correct them. In many cases we have improved on what was here when we settled this country.

We Americans have done a lot of things right, as well as some things wrong, in our use of natural resources. If we now plan intelligently, using information and knowledge acquired from both the successes and failures of the past, there is no reason why we cannot continue to make this country a desirable and productive place in which to live. ♦

What is this American land that

It is roughly 3,000 miles wide, not including Hawaii—although that may be our most beautiful state. It is 1,500 miles North and South, not including Alaska, although that is our biggest state.

It is 3,615,122 square miles of land and water on which 210 million Americans have produced, side-by-side, the world's greatest industrial and agricultural economies.

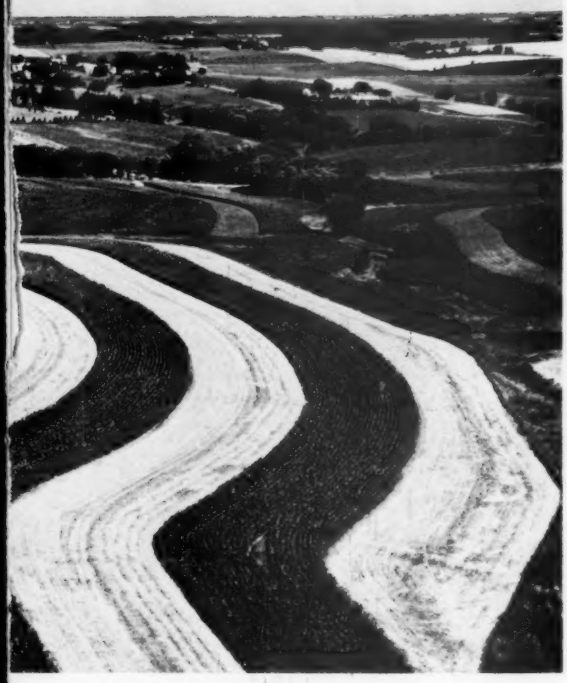
It is woodland and grassland and bone-dry deserts and green mountains and ice-covered tundra and tropical rain forests. It is bounded by the biggest freshwater lake on earth and contains the largest single area of rich productive farmland in the world. It is sprawling cities and growing suburbs and endless miles of corn and wheat and cattle.

Its agricultural abundance feeds not only its own people but some of the rest of the world as well.

But there are problems with the American land.

The problems are polluted air, dirty water, misused land, and the disposition of the wastes and other excreta of our 20th century way of life.

The problems are the use of soil and water as expendable products to be dirtied, used up, and thrown away, a process that ignores their innate qualities. The problems are "planning" for people, in which the real needs of people



so many people are planning for?

are not fully met. The problems are compounded by the old and unattractive human qualities of greed and ignorance and fear.

The American land can be changed for better or worse. A "dust bowl" region of gullies and gritty wind can become a beautiful sight of blue skies and miles of tall, productive yellow wheat. A scrubby rangeland can return to sturdy green grass. A hot, treeless prairie can grow ash and Russian olive and other trees to protect people and wildlife, add beauty, and hold the soil.

All of this has happened to America in the 20th century.

Less happily, a fishing stream can become a mudhole, or a tree-covered mountain can be stripped to resemble the scarred backside of the moon. But even then, it is in our history and our character to believe they can be restored, and to act on that belief.

The American land has present problems and future possibilities that are the rightful concern of planners. We must all deal with blueprints, and cost-benefits, and thick books of statistics that slice and weigh and measure the components of land and water for our various uses. But in the process let us also remember to look at the land whole, to enjoy its beauty, and to seek an understanding of the people that it serves. ♦

A rancher's view of land planning

William E. Richards, of Harlan County, Nebraska, is a banker and rancher who feels that "land use planning, like planning your day-to-day living, is a continual process."

Richards, who began as a tenant farmer, calls his 5,000-acre ranch "Nip and Tuck," reflecting the uncertainty of his earlier years. A Great Plains conservation cooperator since 1959, he is active in local civic and educational affairs. He was interviewed by Robert Buis, SCS information specialist, Lincoln, Nebr.

Bill, from a conservation farmer or rancher's viewpoint, how important is wise land use to his future or to the future of the community?

It's very essential. We have only so much land. If we are going to support an increased population and feed our people at the standard of living we now have, it is absolutely essential that we preserve this land and use it wisely for the generations that come after us.

Do you feel that one individual's land use decisions affect the total community?

Yes indeed. Especially if that individual embarks on a program or a new idea that everyone else has thought about but no one has actually put into effect. I am thinking, for instance, of parallel terraces. After they had been done here a couple of times, they caught on and really influenced the whole area.

The effects of a conservation plan don't stop right at the property line. They very often extend beyond, and it's important that one farmer cooperate with his neighbors and maybe even come up with a pooling of resources to extend the farm plan beyond his borders.

Do you need much land use planning for cropping and grass systems?

Oh yes! A farm plan gives the landowner a complete and detailed inventory of his land and water resources. Add to this the proposed cropping system, and you get a suggested land use plan consistent with the proper use of land. This is highly important in our area, as we have several different types of soils, a varied topography, and considerable differences in degree of existing erosion.

How is the water situation here?

We are fortunate in having an abundance of underground water. But we cannot afford to mine it. To make efficient use of the water, we must know the soil's capabilities for absorption.

If a field isn't suitable for row-cropping, do you put it back into grass?

Yes. Our ranch was put together by the purchase of many single units. Over the years, as we purchased adjoining areas, the first thing we did was ask for a soil survey and planning assistance through our local soil and water conservation district. Very often we found that parts of each farm were wholly unsuited to continuous cropping. The first thing we did on those areas was to shape the land where needed and reseed it back to some kind of warm-season grass.

Along with your crops, do you have a livestock operation?

Yes, rather extensive. We run both a cowherd and yearlings and in addition have a fattening program.

How does land use planning fit into a livestock operation?

The first thing you have to know is the stocking rate of your range. That means not just to eye-ball the land but to actually get a range survey of the plant population, the kinds of grasses, and a projection as to the number of cows that it will carry.

Secondly, there may be an area where you can profitably combine the use of native grass pasture with an irrigated grass pas-

ture. This has been exceptionally beneficial because in doing this we have increased the amount of grass on our native ranges—through letting it rest—and at the same time utilized some otherwise rather poor land for irrigated pastures.

Bill, you are a rancher, a civic leader, and also a banker. From the banker's viewpoint, how important is land use planning?

The first thing a banker looks at in any loan is the collateral. In most instances in our area the collateral will be land or at least land as a base. Anything that we can do, or the borrower can do, to increase the value of that base will make the loan more secure. As a banker, I am interested in what the borrower does with his land. If we, as bankers, can steer him to the right place to get conservation help on his farm or ranch, this is the first thing to do. It may seem selfish, but it's nevertheless true.

In other words, if you lend money, you want to lend it on good collateral?

And the best collateral is land that's been taken care of.

We have talked about general land use planning. What is an example of a personal land use decision you've made on your ranch that has paid off?

Well, there were a number of areas on our ranch where irrigation and floodwater drained off the land down into creeks. These were mostly dry creeks which flowed only during floods or periods of irrigation. For years I had eyed these particular drainageways with the idea in mind that we should dam them up and make irrigation water re-use pits out of them. We did this, and I can truthfully say today that we recycle from 50 to 60 percent of all the water that falls on our ranchlands. It's either recycled back through our irrigation system or held in reserve areas in ponds.

Sounds good. Were there any other results?

Oh yes. Water going down the old drainway had caused a huge gully that was undermining an expensive concrete road structure. In cooperation with the county and the township, we regraded the road and it became a dam or storage area. This drastically cut down the county maintenance costs. Benefits to the county and the township far exceeded the costs.

In addition, some of the reserve water pits are large enough for fishponds and I plan to stock them. They will be very pretty when we plant shrubs around them. So we get good water reuse, a reduction of county costs, and a nice fishing area, all from that one change in land use. ♦

From the ground up

Continued from p. 230

which makes a big dollar difference in initial construction and maintenance costs.

Elsewhere, the city of Shreveport has asked the Soil Conservation Service for a special soil survey on 42 city park sites. City officials also are using the soil survey to plan improvements in road locations and picnic areas. And, the survey is useful in locating wet spots and areas where certain grasses, shrubs, and other plants will grow best.

A 2,000-foot strip around Toledo Bend Lake, which borders Louisiana and Texas, has been surveyed, and the data are being used by the Louisiana Department of Public Works and developers in the area to locate roads, homes, and other construction sites.

Soil surveys are made by walking, or driving, over the land and digging, or drilling holes to determine texture, depth, and color. Soil scientists look at slope, wetness, soil dryness, and amount of erosion. They also check the kind of vegetation in the area. These data are then plotted on an aerial photograph.

Soils are named according to a recognized international system. There are about a thousand different soils in Louisiana and more than 70,000 in the United States. After the soil is named, a description is written for each soil type.

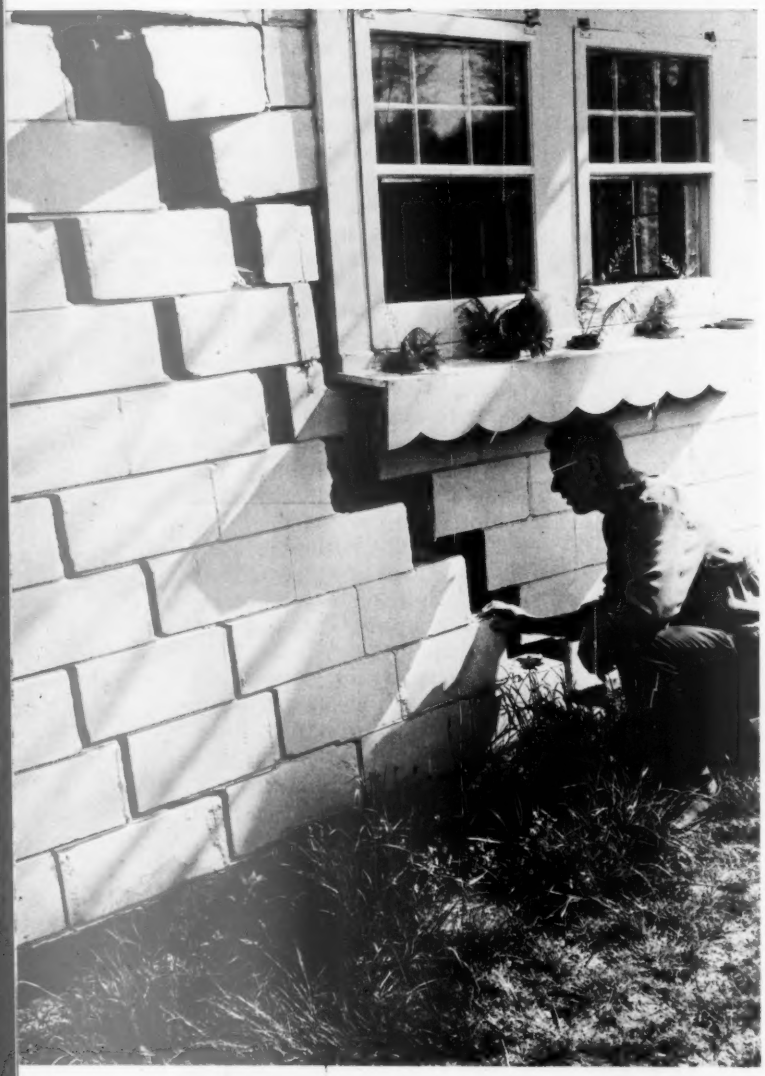
Over 8 million acres of Louisiana have been soil surveyed. Surveys have been completed in 14 parishes, and published reports are available in six parishes. Soil scientists, who make the surveys, also help to interpret them. Help is also available on erosion control and water management on problems within cities.

Why all this interest and concern about the soil? For one thing, as people crowd into urban centers, the choice building sites become scarce. Planning commissions and city governments are recognizing conservation and land use problems and want solutions. They know that people want many things from the land, but few know how to plan and use it rightly, or have much information on its limitations and potentials.

As Farmerville's Mayor J. G. Elliott says, "Our town is going to grow in some direction. If we know about the soil and its limitations, we will grow in the right direction and with less expense." ♦

Wherever you live . . .

Land use planning hits home



Good land use planning is the farmer's bread and butter. But it affects the daily life of suburbanite and city dweller as well. The following examples of good and bad land use planning among the concrete and condominiums can be duplicated in every state. Therein lies the problem and the challenge.

Poor land use planning can put your basement ankle-deep in muddy water. It happened in Delaware County, Pennsylvania, where the architect called it "a bad soil and water problem. We just didn't know about it." But the county had a 10-year old soil survey, and the information was available to builders before they built.

Poor land use planning can mean you face—or file—a lawsuit. City officials of Falls Church, Virginia, were ready to sue the owner of a vacant lot after heavy rains washed large quantities of his bare, eroding soil into nearby streets and sewers. The city had to buy a special cleaning machine to open the clogged-up drains.

Poor planning can make you sick. A Wisconsin nurse went to visit several young children who were home with a mysterious illness. As she parked her car, she spotted a wet, smelly area on the lawn. The sewage had backed up and overflowed—and children were playing in the area! The homes were built on soil that was slow to absorb septic tank effluent. Several families had to sell their homes and move.

Poor land use planning can wreck your house. It's happened to numerous homeowners, including the man in the picture, who built a home on unsuitable soils.

Poor planning wastes tax money and puts a higher price tag on community services. A town near Detroit, Michigan, added $200,000 to a construction job because its new water main went through a 600-foot wide area of deep

peat soils. It could have gone through normal mineral soils nearby at less cost.

A New York town paid $235,000 more than it had planned for a sewer system because of a miscalculation in depth to bedrock caused by unrepresentative test borings. An hour's study of the county soil survey would have shown that some soils along the sewerline were less than 20 inches to bedrock.

And, citizens of a Colorado community were taxed to build a new $2.4 million schoolhouse. Six years later, the walls had buckled, the ceiling had fallen, and the building was condemned. The school was located on unstable soils. More than a million dollars have now been appropriated for repairs, but engineers are doubtful that repair is possible. But—planners could have looked at the soils more closely before authorizing the building.

Poor land use planning by your neighbors can cause *you* problems. Upstream construction in the watershed above Lake Barcroft, Virginia, eventually added huge deltas of mud to the lake and cost the homeowners "mud money." Lake Barcroft citizens—who had not caused the problem—spent thousands of dollars to maintain the silt traps that kept it clean.

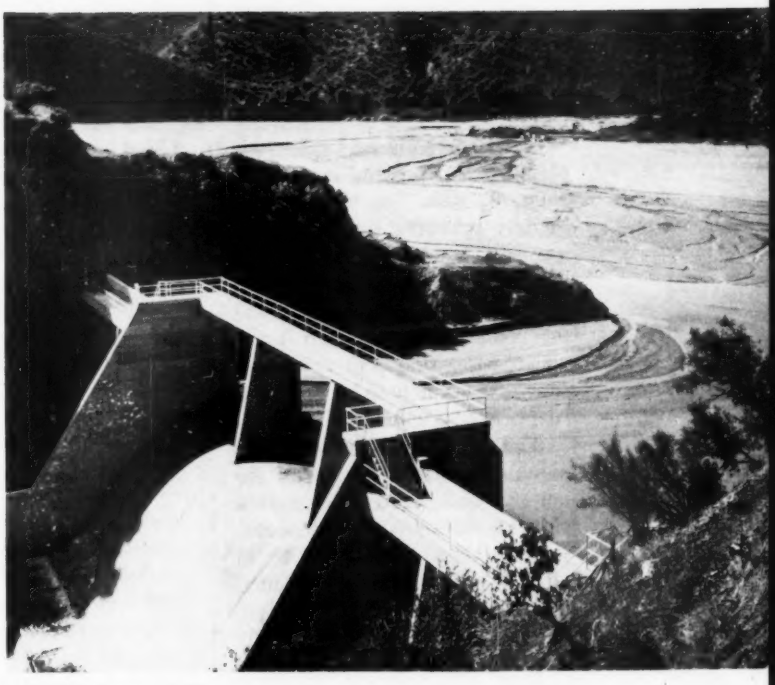
Urban pressures on land use can raise food prices and lower food quality. Urbanization is crowding the avocados, artichokes, and other speciality fruits and vegetables out of some areas where soil and climatic conditions are particularly well suited to them. Most of the crops can be grown elsewhere, but costs may be higher (so will retail prices) and the taste and quality less desirable. And, while most land can easily go from artichokes to apartment houses, you cannot reverse the process without great expense and difficulty.

Poor land and water use planning can ruin water supply reservoirs. It happened years ago when soil erosion silted up this reservoir (see picture)—and it continues to occur.

Finally, poor land use planning can mean ugliness and landscape deterioration. And that hardly needs documentation!

GOOD LAND USE PLANNING—and implementation of the plans—can save you tax dollars. The soils in a strip of Illinois land under consideration for a new highway were very poor for building. Local planners chose another route instead, and saved over $800,000 in excavation and construction costs.

And, San Antonio, Texas, engineers discovered that parts of their city were underlain with a special soil that triggers an electrochemical process which destroys metal. Underground utility pipes going through this soil corrode in a few years. So, San Antonio officials check the soil maps, then place their utilities as far as possible on "normal" soils.



Good land use planning and implementation can protect your water supply. Lake Johnson is a major source of water for Raleigh, North Carolina. A large apartment building was proposed for the area. An SCS study found there was a good possibility of serious damage to the water supply if the apartments were built as originally planned. The study indicated that no development around the lake was preferable, but if unavoidable, soil conservation building methods would reduce sediment runoff from the area by 90 percent. The builders have promised to follow these methods if city officials okay the construction.

Good land use planning means not having to say you're sorry when you finish building a home. It means knowing what a flood plain is; building on soils that will support your home (no shrink-swell, no future landslide); understanding why you can, or can't use a septic tank sewage system, dig a satisfactory pond, or plant grass that grows.

Local planning boards increasingly are using basic natural resource information. Some of the tools are flood-plain facts, soil survey maps, and legal requirements for controlling soil erosion during the building process. During 1972,

more than 26,000 state or local government agencies asked the Soil Conservation Service for help with natural resource problems.

Good agricultural land use planning can provide more food from the same, or fewer acres, thereby releasing land for other uses. Cattleman Dan S. Budd of Wyoming used a conservation land use ranch plan, and doubled the "output" of his ranch. Land which supported 350 cattle before he implemented his plan now supports 650 cattle.

And, good agricultural land planning means better use of the nation's land. Corn is not a good crop for hilly land—it's too erosive, too "hard" on the soil. From 1919 to 1972, the acreage planted to corn nationwide decreased, but corn production rose greatly—it more than doubled—because average yields were much bigger. At the same time, corn acreage in the South Central States, where hilly terrain and longtime erosion problems make much of the land better suited to trees or pasture, dropped sharply, from 24 million harvested acres in 1919 to only 3 million harvested acres in 1972.

Good land use planning means more, and more convenient, parks, lakes, bike trails for people. SCS District Conservationist Herbert Boe, of South St. Louis, Minnesota, helped a developer with a housing plan for 100 acres. At Boe's suggestion, the developer changed the original plans to provide future homeowners with three ponds, a park area, a 5,000-tree shelterbelt, plus more trees and shrubs for beauty and soil erosion control.

Good land use planning means more wildlife to hunt, photograph, or enjoy. Farmers and ranchers have changed more than 9 million acres of land from crop use to recreation and wildlife. They've improved wildlife habitat on nearly 30 million acres of upland and nearly 4 million acres of wetland. They've built nearly 2 million ponds. More and better fishing and hunting are two results.

Good land use planning brings beauty. The planned new communities of Reston, Virginia, Jonathon, Minnesota, and Columbia, Maryland, are suburban examples. Well-kept farm fields, green pastures, and clear lakes and streams are rural examples.

Finally, advance land use planning will help meet national needs for

- —good homes and new communities
- —adequate supplies of food and water
- —desirable and convenient recreation areas
- —the preservation of some areas for wilderness and solitude

Dr. Kurt Bauer, director of the Southeastern Wisconsin Regional Planning Commission, said, "We envision an increase of 900,000 people in our seven-county area in the next 25 years. If development were uncontrolled, we estimate that 410 square miles would be converted from rural to urban use in this period. If our plan is followed, however, the same number of additional people could be accommodated in a comfortable density in just 200 square miles."

America has enough space—enough natural resources—to meet its future needs, if the American people are good stewards of the land and plan its use wisely. ♦

Meetings

June

3–6 National Watershed Congress, Witchita, Kans.
3–7 General Federation of Women's Clubs, Baltimore, Md.
4–6 Third Annual Conference on Pollution Control in the Marine Industries, International Association of Pollution Control, Montreal, Canada
7–11 National Audubon Society, Denver, Colo.
10–13 Workshop on Environmental Problems in the Extractive Industries, sponsored by the Geological Society of America, Society of Mining Engineers of AIME, and Water Management, Dayton, Ohio
10–15 Outdoor Writers Association of America, Grand Rapids, Mich.
11–14 International Symposium on Remote Sensing and Water Resources Management, Burlington, Ontario, Canada
17–20 American Society of Agricultural Engineers, Lexington, Ky.
17–22 Ecological Society of America, Amherst, Mass.
17–22 American Institute of Biological Sciences, Amherst, Mass.
18–20 American Plywood Association, Gearhart, Oreg.
20–July 4 American Association for the Advancement of Science, Mexico City, Mex.
23–26 Ecology Council of America, Catoctin Park, Md.
24–28 American Seed Association, Atlanta, Ga.
24–28 National Federation of Business and Professional Women's Clubs, San Juan, Puerto Rico
24–30 National Environment Health Association, Atlanta, Ga.
25–29 Air Pollution Control Association, Chicago, Ill.

The role of conservation districts in land use planning

by Gordon K. Zimmerman
Executive secretary
National Association of Conservation Districts

For almost 40 years, soil and water conservation districts have advocated two basic environmental principles: use land within its scientifically determined capabilities, based on soil surveys and their interpretations, and treat land according to its needs for protection and development.

These principles were put into practice on individual farms and ranches, through the personal responsibility of farmers and other landowners, and with their voluntary cooperation.

Then, some larger natural resource needs and problems became apparent and soil conservation districts became involved in farm forestry, flood control work, and the economic development of their areas.

Today, even broader needs are evident. In 1973, people are interested in protecting and improving nothing less than the entire natural environment. They want clean air and water, suitable places to dispose of solid waste, better outdoor recreation areas, better water supplies, and a generally better environment. They want, in short, what only orderly land use planning can bring.

Conservation districts have some unique assets that qualify them for an important place on the land planning team. District supervisors know the physical land and water facts of their area. They know the people in their area. And they know the needs of these people. Many district supervisors rightly feel they have a clear responsibility to participate in local land use planning.

Districts can provide land use planning groups in their area with data on natural resources, their views on critical land and water problems and opportunities within the district, and the principal purposes for which land should be planned, as the district sees them.

Districts should request the opportunity to review, from the standpoint of responsible laymen and local resource officials, any land use plans involving the district that are prepared by any planning group or agency. As a corollary to this, the district should have the opportunity to make recommendations with respect to any plan.

Districts can and should initiate land use planning, at least in an elementary form, for those areas where no planning has been done and where valuable resources are being jeopardized as a consequence.

Much current land use planning stops at the city limits. Much of rural America does not yet have the benefits of detailed planning work. Districts are in a position to make a significant contribution in these areas, as well as in areas where comprehensive planning is already underway.

But, district people should be aware of at least two major, emerging problems associated with land use planning.

First, the question of so-called human or social "rights" versus traditional property "rights." If the pursuit of economic development continues along the traditional lines that are largely determined by private initiative—and if this conflicts with the general public's interest in a healthier environment—then how should the desirable direction for future resource use and economic development be determined?

And second, who should make important resource decisions? Should it be local people and local governments, who are the most immediately concerned, or should it be people farther away; those presumably, with a more objective view of the interests of society as a whole?

Who determines the public interest? And, if a distant body is authorized to act in the "public interest," what will happen to American democracy? ♦

Tahoe: planning for a special area

Beautiful sky-high Lake Tahoe—22 miles long and 12½ miles wide—is noted for its crystal clear blue waters and its breathtaking mountain scenery.

But recently, the lake has been threatened with various forms of pollution, while the surrounding five-county California-Nevada Tahoe basin area has had land development problems that could change its legendary beauty into landscape blight.

In 1970, many years of concern for the unique environmental qualities of the area led to establishment of the Tahoe Regional Planning Agency. Its director is Richard M. Heikka.

The agency's charge is to provide for the kind of planning, conservation, and development that will accommodate the legitimate needs of people without destroying the environment.

The agency has both planning and regulatory functions, with ordinances covering land use, grading, and subdivision and shoreline areas. A unique feature is its land capability districts, in which areas are rated according to an "environmental sensitivity" scale of one to seven, based on soil types, topography, and other natural features. This determines the percentage of land that can be disturbed by development.

In 1971, The Soil Conservation Service and the Forest Service (on forest lands) completed the mapping for a Tahoe basin-wide soil survey. The information was incorporated into the Regional Planning Agency's land capability guides.

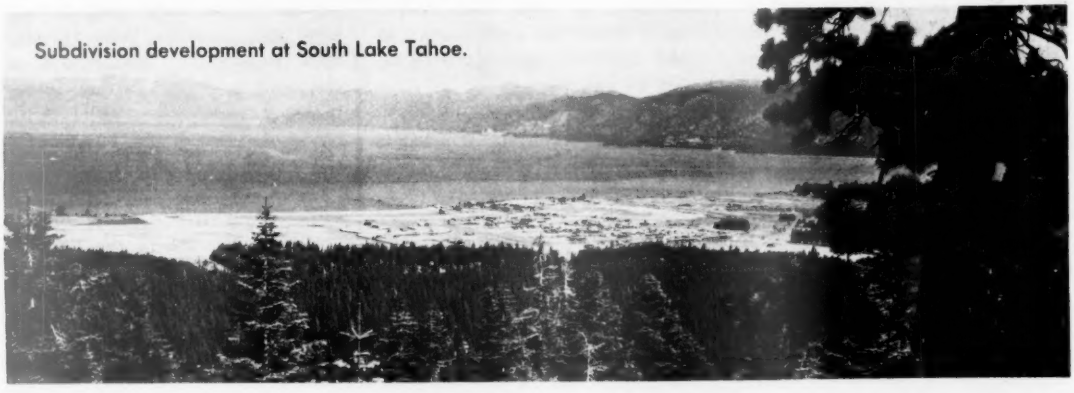
Recently, Soil Conservation Service's Resource Conservationist Leonard A. Anker talked with Mr. Heikka about the work of the agency. Excerpts from Mr. Heikka's remarks follow:

On the Lake Tahoe plan. "The Tahoe plan is heavily based on environmental data put together by many agencies and . . . the Soil Conservation Service input on soils has become a very integral part of the animal we finally called the land capabilities map. This is a look at the landform, with heavy emphasis on soil information. Additionally, we had inputs dealing with geology and vegetation and a great deal of other data assembled by state and federal agencies and by volunteer workers. We estimate that if we had to go out and contract for this, starting fresh, we'd probably have $2 million worth of data to put together—and that's a conservative estimate."

On the use of soil information. "Our land use regulations deal with land use districts. Based on the technical interpretation of the soils data, we platted restrictions on land coverage and the amount of disturbance allowed at any given site. This is totally related to the soils classification as a major input in the land capabilities map, which is included right in the ordinance. It's really the basic way in which we have identified what we think is the very sensitive and fragile environment here at Lake Tahoe.

"This has resulted in severe restrictions on land development practices. As an example, a typical residential development even in our best soil capabilities area is restricted to a 30 percent disturbance factor. Until a few short years ago, this was unheard of in residential developments.

"We also use soil information in locating flood plains. Certainly we use some of the traditional U.S. Army Corps of Engineers flood-plain data, but we also look at the basin from the standpoint of stream environment zones. Normally these will not only include the flood plain but the



Subdivision development at South Lake Tahoe.

riparian vegetation as well. It's important to know this from the standpoint of maintaining wildlife habitat in wetland areas."

On legal aspects of enforcement. "Interestingly enough, everybody assumed we would be overwhelmed in the courts in any lawsuit. In fact, we've picked up something in the nature of $220 million in claims for inverse condemnation. This came about because, based on a solid foundation of environmental information, we made some severe cutbacks from the traditional zoning that had existed earlier at the local government level.

"But the only area of ordinances that has even come under questioning so far has been the land use ordinance. The only completed case to date was a class action suit against us, which went into federal court and was successfully defended by the agency.

"We are routinely enforcing provisions of the grading, subdivision, and shorelines ordinances, using the misdemeanor provisions of the agency's law and effectively obtaining legal action where necessary. Actually, we were amazed at how little problem we had."

On protecting Lake Tahoe. "We have to appreciate that there's been a hundred years of abuse in the basin. In most cases it was abused without people realizing what they were doing. The purpose behind our program is to cut down on the rate of eutrophication of the lake. We're optimistic that we've turned the corner."

On erosion and sedimentation in the Lake Tahoe basin. "The experts tell us that Lake Tahoe, which is probably second only to Crater Lake in its purity and clarity, is subject to a loss of that clarity from three factors: liquid waste, solid waste, and sedimentation. We have fairly effectively controlled liquid and solid waste disposal through ordinances. About 85 percent of all sewage is now exported from the basin, and we expect that within 2 years all sewage will be exported. The opinion now is that if we can effectively control (soil) erosion in this basin we can effectively guarantee the clarity of Lake Tahoe for future generations. So sediment control is very critical, and a major thrust in virtually all our regulations is tied to this aspect."

On controlling man-caused sedimentation. "We use the land capabilities map in reviewing sediment control plans. But we have gone further and created an informal development review committee of resource experts in the various disciplines. Certainly an integral part of this (group) are the SCS people who are participating in this review and giving us their technical help on specific development plans.

"We've identified a great deal of land in the basin as having a principal and primary function of watershed protection and its broader implications of protecting the special qualities of Lake Tahoe. There's no question in our minds that for many of the lands, both public and private in the basin, this will be its only use."

On the agency's shoreline erosion control regulations. "We have begun, through our studies, to identify man-caused problems along the shoreline, and the ordinance is designed to correct or solve these. This is a tough one. There is little precedent for the nature of the regulations we're developing. We expect to have some very interesting times with specific development proposals over the next year."

On revegetation plans for developing areas. "We have very shallow soil mantles here. Where there is some disturbance such as road cuts we are requiring immediate revegetation.

"We've developed a design guide which is now in the final throes of adoption. The wonderful thing about the Tahoe Agency is its ability to move out of the realm of research into the realm of regulation. We desperately need more research, and as we get it we will build it into our normal operating posture."

On agency relations with the Soil Conservation Service and Forest Service. "I think we've probably received far more help (from USDA) than anyone could have anticipated earlier—it has really been a joint effort. What we now see developing is a continued cooperation that will, hopefully, be a two-way street, wherein the soils people will have the opportunity of acknowledging a new interpretative approach to soils data. I would guess from this point forward we will offer a great deal in the way of information as to how we use this help and, hopefully, expand the opportunities for the Soil Conservation Service (to do this kind of thing) elsewhere in the country."

Final comments by Mr. Heikka. "We've got a charge from Congress to protect a very fragile environment, yet on the other hand provide for the orderly use of the lands in the basin by man. It's a tough challenge, but all of our information and work has been focused on this attempt. While we may not have a perfect solution, I think that we are further down the road, comparably, than any other planning agency in the United States in really understanding the limitations of the environment as a basis for planning. We see this as a springboard for the broader national program that certainly is coming." ♦

One planning tool

From the ground up

by Gene Warren
Public information specialist, SCS
Alexandria, Louisiana

About 48 percent of the entire United States has been soil surveyed—a larger percentage in populated regions. Survey information, including interpretive help, is available from local conservation districts, local or state SCS offices, state or federal (USDA) extension offices, and some local, regional, and state planning agencies.

Here's how town and city officials in one state are using this information.

More than 200 towns, cities, and other units of government in Louisiana have turned to their soil and water conservation district and the Soil Conservation Service for help in solving conservation problems. This is a big change from a few years ago when conservation work was mainly done on farms.

A major form of help is soil survey information. A survey is a tool for learning about the soil —its capabilities and limitations. It can help farmers, land developers, engineers, road builders, planning commissioners, and others to cut building costs and to plan the land's best use.

Soil scientist working near Alexandria, Louisiana.

Springhill, for example, has a soil survey covering land in and around the town. Mayor James Allen says, "This information tells us that some soils around here are poor for constructing buildings and roads. On the other hand, it shows good areas for homes and land development. We used the soil information to develop our city plan, and I am proud it was done right."

DeRidder is another town that is doing things right. The city and the Beauregard Parish Police Jury entered into an agreement with the SCS to have a special soil survey made for 30,000 acres. DeRidder Mayor Frank Delia says of the completed survey, "This helps us to pinpoint soil problems as we expand our sewage system. The survey is going to be a big asset to builders, businesses, and industry."

In and around New Orleans, SCS has soil surveyed 50,000 acres of land that may eventually undergo development. The Jefferson, Orleans, St. Bernard Parishes Regional Planning Commission paid half of the costs.

Almost all areas around New Orleans that are still available for building have soils with severe limitations for use as homesites. But, among the soils with severe limitations, some are less severe and cost less to develop than others. The survey discriminates between them.

Some soils around New Orleans, for instance, will require friction pilings 30 feet long to support a home foundation, while no pilings at all are needed to support the same weight building on other soils. Some organic soils sink away at a rate of about 1 inch per year with broken sidewalks, driveways, and foundations as a result. Which soil is

Continued on p. 223

Land and water planning go together

Modern land use planning recognizes the vital relationship between land and water. The water conditions of an area—frequency of flooding, annual precipitation, ground reserves, concentration or disposal of runoff—often determine the land uses that are possible or desirable.

Altering water conditions can have a major effect on land use. Small watershed projects are an example.

Watershed projects protect land from flooding through engineering methods (small dams, improved water courses) and through helping to "keep the raindrop where it falls" by good soil conservation methods above the dams or reservoirs.

If the protected lowlands are converted to a more intensive agricultural use (and this may happen, because they are often more fertile and level), then the steeper uplands in the watershed can be converted from crops to pasture or woodland or other less intensive and often more suitable uses.

If the newly protected lowlands are already in urban use, a watershed project can help prevent the flooding of homes and—if planned this way—can often provide the town with a new source of municipal or industrial water. This offers the town a chance to improve its community facilities or to expand its industrial base.

Again, if planned in advance, many watershed projects can provide water-based recreation or improvements in fish or wildlife habitat.

Finally, in the course of planning a watershed project, the sponsors collect a great deal of pertinent hydrologic and soils data. This can help local planners to solve other natural resource problems.

Hurricane Agnes, in June 1972, caused billions of dollars in flood damages to states along the Atlantic seaboard. But the town of Wellsboro, Pennsylvania, stayed dry and avoided an estimated $10 million in flood damages through protection afforded by the Marsh Creek Watershed Project.

Flood protection for the area was only one effect on the land. All three project lakes provide fishing; one provides for boating and picnicking, and another holds a large municipal water supply for Wellsboro. Local residents claim that the watershed project, by providing flood protection and better water supplies, has been a major catalyst in improving the area.

During the period of planning and building the project, the community purchased the local water company, installed new street lights, and rebuilt the main street. In addition, several companies expanded, new jobs for local residents opened up and—partly due to the new lakes—the area is growing as a popular all year round tourist spot.

Culpeper is a progressive Virginia town. But periodic floods used to wash away much of the progress. Floodwaters damaged roads, homes, and stores and put the sewage disposal plant out of commission. The same floodwaters removed topsoil and ruined crops on surrounding farmlands.

Between floods there were dry spells. Twice the town's main water source, Mountain Run, went dry.

The Mountain Run Watershed project started 19 years ago. Today five dam-created lakes and intensive soil conservation work on surrounding land mean protected farms, flood control in Culpeper, more water for municipal and industrial use, and Culpeper's first park, centered around one of the lakes. A dozen new industries or businesses have arrived, assured of ample water supplies; a new hospital has been built, and the town's population has more than doubled. The watershed project has received widespread community backing.

The city of Warrenton, Georgia, had an insufficient water supply for growth. City fathers joined their rural neighbors in the Rocky Comfort Creek watershed area and made comprehensive plans for better water use in the area.

The results were multi-use reservoirs for both flood prevention and increased municipal and industrial water supplies. This permitted sewage oxidation ponds to be built with assurance that sewage lines could be extended. A sizable amount of water was also stored for development use.

Ed Ricketson, chairman of the Central Savannah River Area Planning and Development Commission, says that "because of this watershed project, we now have an almost unlimited supply of water. This has allowed us to build a new industrial park. The site has been called the most desirable industrial park location in the area, but without the water we couldn't have done it."

Some land areas—low, coastal plains, for example—have no

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suitable water impoundment sites for lakes, so the engineering work may consist almost solely of improving waterways. The *Mill Creek Watershed Project*, in Bryan and Bullock Counties, Georgia, is an example.

The area has a normal rainfall pattern of excessive rains, followed by long periods of little or no precipitation. After heavy rains, water would stand around for days or weeks. In dry periods, the channels became mudholes.

In 1963, when the area's small watershed project was being planned, 83 percent of watershed land was in trees or forest, 10 percent in crops, 4 percent in pasture, and 3 percent in other uses, including land in the town of Pembroke. Local watershed project sponsors wanted to improve all of these land uses.

The channel work for the project lowered the almost ground-level water table by 1 foot. This helped prevent flooding because the dry soil above the altered water table acts like a sponge, soaking up standing water after a heavy rain, then releasing it slowly and safely into the channels.

However, too low a water table could damage some of the existing trees in the forested area.

To avoid a possible flood prevention-versus-forest land conflict, the local people checked with the U.S. Forest Service on the optimum water level for the slash and loblolly pines which make up most of the tree species in the area. It was determined that lowering the water table a foot would provide sufficient flood protection while still supporting tree growth in the swampy areas and generally improving the pine growth.

When the watershed project was completed, the acreage of woodland decreased slightly, from 33,029 to 32,829 acres, but the improved water control, combined with easier access to the forest area for fire control and other uses, is expected to mean a more vigorous tree growth.

Total cropland acreage is not expected to increase, although use of suitable cropland may be more intensive. With improved water control, the same land now merits more intensive use.

During the actual channel work, a swath was cut through the forest to accommodate machinery. Watershed people returned 1,341 of these cleared acres to the pine, sycamore, and yellow poplar that had previously existed, while the remaining 923 acres went into wildlife-attracting trees and shrubs such as crabapple, Chinese chestnut, autumn olive, and sawtooth oak. One result, says Bryan County Commissioner Warren Miller, is that "the deer population has definitely increased. Mill Creek was once nothing but a mudhole. Now there's more for the deer to eat, and there's water throughout the year."

Other changes include an improved sewage system for Pembroke and the development of an industrial site. These were not possible earlier because of the floods and high water table.

The final tally on land use changes since the project's completion 2 years ago: slightly less forested acreage; the improvement of some land for wildlife habitat use; increased opportunities to enjoy hunting; better community facilities in Pembroke, and an improvement in land use for forestry and farming.

In town or out in the countryside, land and water use go together. Watershed projects, by planning for water management on an areawide basis, fit squarely into the land use planning picture. ♦